WE CLAIM:

1.   A method for use in seismic data processing to control the wavelet phase spectrum of seismic data collected using a seismic source with a known signature wavelet and at least one receiver, said method comprising the steps of:

(a)   using the source signature to design a first phase-control filter to limit wavelet phase spectrum consistent with assumptions inherent in at least one subsequent processing step, having first processed the source signature with any processing steps previously applied to the seismic data;

(b)   applying the first phase-control filter to the seismic data before said subsequent processing steps; and

(c)   performing all subsequent processing steps on the phase-controlled seismic data.

2.   The method of claim 1, wherein the first phase-control filter shapes the source signature to minimum phase.

3.   The method of claim 1, wherein said subsequent processing concludes with a second phase-control filtering of the seismic data, said second phase control filter being designed in steps comprising applying the first phase-control filter to the source signature from which it was designed, then processing the filtered source signature with said all subsequent processing steps up to the second phase-control filtering, and then using the resulting source signature to design a second phase-control filter to limit wavelet phase consistent with post-processing needs.

4.   The method of claim 3, wherein the second phase-control filter shapes the source signature to zero phase.

5.   The method of claim 1, wherein said at least one subsequent processing step comprises the steps of receiver-consistent deconvolution and predictive deconvolution.